

We claim:

1. A process for preparing an alkene oxide, which comprises at least the steps (i), (ii) and (v):
 - (i) providing a stream S1 comprising compressed, liquid alkene;
 - (ii) depressurizing at least part of the stream S1 with absorption of heat and with at least partial vaporization of the liquid alkene;
 - (v) reacting the alkene obtained in (ii) with a hydroperoxide in the presence of at least one solvent and at least one catalyst to give a mixture comprising alkene oxide and the at least one solvent.
2. A process as claimed in claim 1, wherein the alkene is propene, the hydroperoxide is hydrogen peroxide, the catalyst used is a titanium silicalite catalyst and the solvent is methanol.
3. A process as claimed in claim 2, wherein the stream S1 in (i) comprises liquid propene at a pressure in the range from 20 to 35 bar and a temperature in the range from 5 to 30°C.
4. A process as claimed in claim 2 or 3, wherein at least part of stream S1 is/are depressurized to a pressure in the range from 4 to 10 bar.
5. A process as claimed in any of claims 1 to 4, wherein the refrigeration effect produced by the depressurization in (ii) is transferred in at least one heat exchanger to at least one suboperation of the alkene oxide production process.
6. A process as claimed in claim 5, wherein the suboperation of the alkene oxide production process is the condensation of a vapor which consists essentially of alkene oxide and is obtained in the separation of alkene oxide from a mixture (M1) comprising alkene oxide and at least one solvent by distillation.
7. A process as claimed in claim 6, wherein the mixture (M1) is obtained from a process comprising the steps (v') and (vi):
 - (v') reacting the alkene obtained in (ii) with a hydroperoxide in the presence of at least one solvent and at least one catalyst to give a mixture (M0) comprising alkene oxide, unreacted alkene and the at least one solvent;

(vi) separating the unreacted alkene from the mixture (M0) to give a mixture (M1) comprising alkene oxide and the at least one solvent.

5 8. A process as claimed in any of claims 1 to 7 which further comprises the steps (iii) and (iv):

(iii) dissolving the gaseous alkene obtained in (ii) in at least one of the solvents used in (v) or (v') to give a solution;

(iv) introducing the solution obtained in (iii) into the apparatus used for the reaction of (v) or (v').

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9. A process as claimed in claim 8, wherein the heat of solution evolved in (iii) is removed by means of river water.

10. A process as claimed in claim 8 or 9, wherein the solvent used in (iii) is circulated.